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May 1988

US EPA RECORDS CENTER REGION 5



1002796

AERIAL PHOTOGRAPHIC ANALYSIS OF THE REFINED METALS CORP.

Indianapolis, Indiana

by

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Contract No. 68-03-3245

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ENVIRONMENTAL MONITORING SYSTEMS LABORATORY  
OFFICE OF RESEARCH AND DEVELOPMENT  
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NOTICE

This document has not been peer and administratively reviewed within EPA and is for internal Agency use and distribution only.



## ABSTRACT

This report presents an intensive analysis of the Refined Metals Corp. located in Indianapolis, Indiana. Historical aerial photography dated 1950, 1956, 1971, and 1983 were used to perform the analysis. This analysis was performed to monitor physical conditions and activities that could lead to the contamination of the surrounding environment, specifically surface and/or ground water.

The 1950 and 1956 photos show the future location of the Refined Metals Corp. In 1971 the site was fully operational with processing buildings, an administrative building, and an open storage area. Uncontained drums were visible in the open storage area. The site appeared to be operational on the 1983 photography; however, no signs of any specific activity were noted.

The U.S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, prepared this report for the Agency's Environmental Services Division in Region 5 at Chicago, Illinois and the Office of Waste Programs Enforcement, RCRA Enforcement Division in Washington, D.C.

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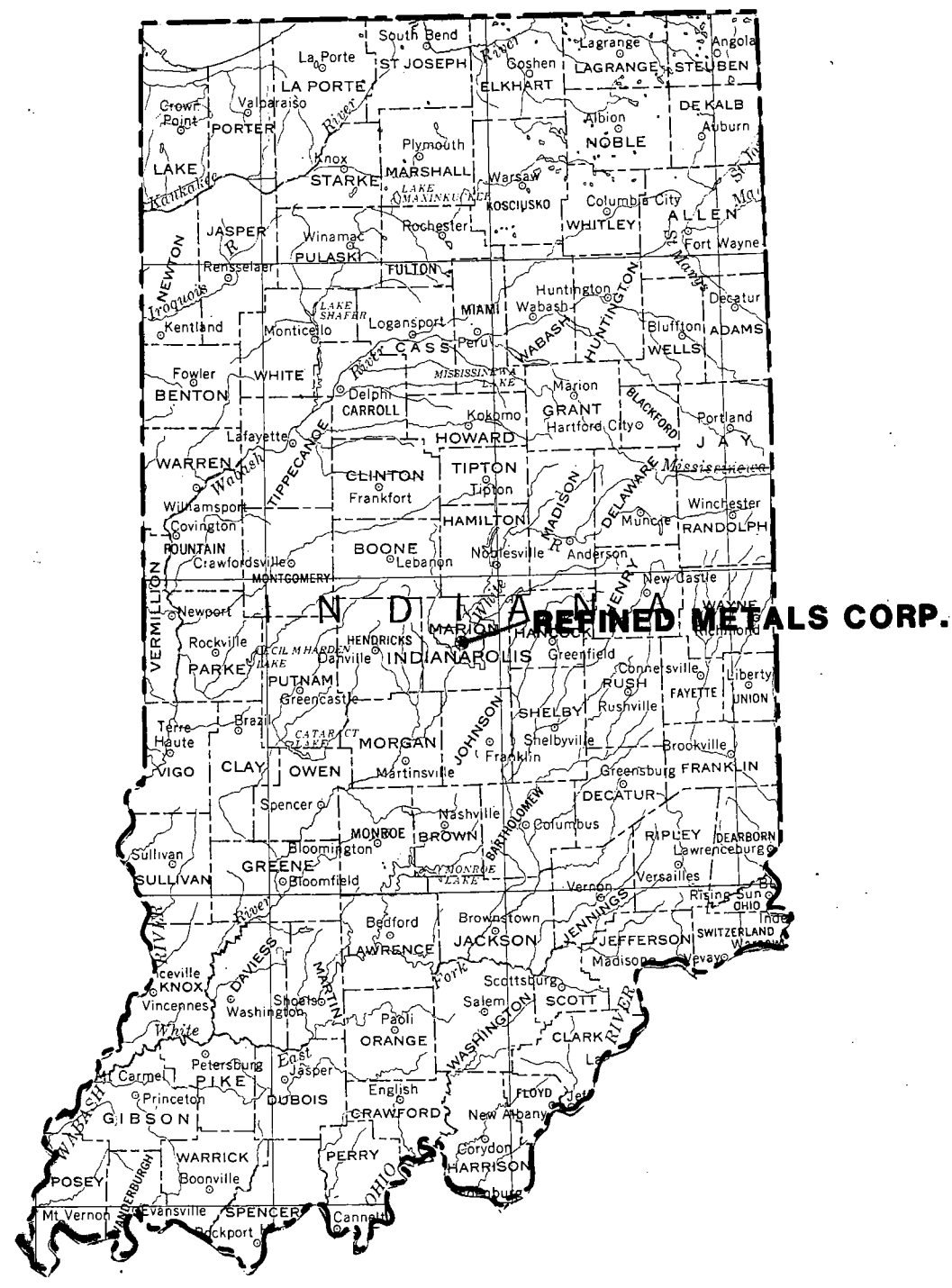
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UNITED STATES (1972)

Figure 1. Site location map, Indiana. Scale 1:2,500,000.

## INTRODUCTION

This report presents an intensive analysis of the Refined Metals Corp. which is located in Indianapolis, Indiana. This report was prepared to document physical conditions and potential hazards at the site.

A total of 13 sites in Indiana (both single-date and historical reports) are covered under this project. These sites are being monitored in order to ensure that activities at the sites comply with the Resource Conservation and Recovery Act (RCRA) provisions. The following table lists all sites in Region 5 covered under this project:

TABLE 1. REGION 5 SITES COVERED UNDER SERIES TS-AMD-87615†

Report serial number†	Site name	Location	Analysis type
1	Adams Center Landfill	Ft. Wayne, IN	Single-date
2	Arvin Automotive	North Vernon, IN	Single-date
3	Bohn Engine & Foundry	Greensburg, IN	Single-date
4	Cabot Corp.	Kokomo, IN	Single-date
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6	General American Transportation Corp., Plt 2	East Chicago, IN	Single-date
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12	Refined Metals Corp.	Indianapolis, IN	Single-date
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23	Northside Sanitary Landfill	Zionsville, IN	Multi-date
23	Quemetco	Indianapolis, IN	Multi-date
#25	Refined Metals Corp.	Indianapolis, IN	Multi-date
26	Stauffer Chemical	Hammond, IN	Multi-date

†To identify individual reports, add the report serial number to the series number. For example TS-AMD-87615-2.

#Sites covered in this report.

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## METHODOLOGY

Stereoscopic pairs of historical aerial photographs are used to perform the analysis. Stereo viewing enhances the interpretation because it allows the analyst to observe the vertical as well as horizontal spatial relationships of natural and cultural features. Stereoscopy is also an aid in distinguishing between various shapes, tones, textures, and colors that can be found within the study area.

Evidence of waste burial is a prime consideration when conducting a hazardous waste analysis. Leachate or seepage resulting from burial and dumping of hazardous materials might threaten existing surface or ground-water sources. Pools of unexplained liquid are routinely noted because they can indicate seepage from buried wastes that may enter drainage channels and allow contaminants to move off the site. An excellent indicator of how well hazardous materials are being handled at a site is the presence or absence of spills, spill stains, and vegetation damage. Trees and other forms of vegetation that exhibit a marked color difference from surrounding members of the same species are labeled "dead," "stressed," or "damaged" based upon the degree of noticeable variation. Vegetation is so labeled only after consideration of the season in which the photographs were acquired.

The U.S. Environmental Protection Agency's Statement of Procedures on Floodplain Management and Wetlands Protection (Executive Orders 11988 and 11990, respectively) requires EPA to determine if removal or remedial actions at hazardous waste sites will affect wetlands or floodplains and to avoid or minimize adverse impacts on those areas. To aid in compliance with these orders, significant wetland areas located within and adjacent to the sites have been identified and delineated. However, the sites have not been visited to verify the accuracy of wetland identification.

Drainage analysis determines the direction a spill or surface runoff would follow. Direction of drainage is determined from analysis of the photographs and from U.S. Geological Survey topographic maps. Whenever they are available, 7.5-minute quadrangle maps (scale 1:24,000) are used to show site location and to provide geographic and topographic information.

Results of the analysis are shown on annotated overlays attached to the photos. The following table provides documentation of the photographs used in this report:

TABLE 2. DOCUMENTATION OF AERIAL PHOTOGRAPHY

Site name, location, and geographic coordinates	Figures	Date of acquisition	Original scale	Film type†	Photo source‡	Project	Roll	Line	Frame
Refined Metals	3	09-06-50	1:20,000	B&W	ASCS	FL	2G	UNK	63
Corp.	4	06-06-56	1:20,000	B&W	ASCS	FL	4R	UNK	30
Indianapolis,	5	08-12-71	1:20,000	B&W	ASCS	FL	ILL	UNK	174
IN	6	04-16-83	1:58,000	B&W	ASCS	NHAP83F	61	UNK	57
39°43.2'N									
086°04.1'W									

†Film type identification:

B&W: Black-and-White

‡Photo source identification:

ASCS: U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service, Salt Lake City, Utah.





Figure 2. Local site location map, Indianapolis, Indiana. Scale 1:24,000.



#### ANALYSIS SUMMARY

The Refined Metals Corp. is a metal reclaiming facility which occupies approximately 11 acres in the eastern part of Indianapolis, Indiana. The site was yet to be constructed when observed on the 1950 and 1956 photography. The site location and surrounding surface drainage are depicted on these two photos (Figures 3 and 4). The 1971 photo shows the site is fully operational and consists of four processing buildings, one administrative building, an open storage area with drums, a small, lined, holding pond, and a small mound of unidentified materials. On the 1983 photography the site appeared operational; however, no specific activity was noted. No spillage was noted on any of the photography studied.

The site is located on a slight hill near Beech Creek and Sloan Ditch but is not near any major waterways and would not be affected by a 100-year flood event.

## PHOTO ANALYSIS

SEPTEMBER 6, 1950 (FIGURE 3)

The photo shows the future location of the Refined Metals Corp. There are no facilities as yet at the site. The drainage in the area includes Sloan Ditch and Beech Creek which flow in a southwesterly direction.





## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- X-X-X-X FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- X X X X X X FENCE
- — — — STUDY AREA

### DRAINAGE

- — — — DRAINAGE
- — — — FLOW DIRECTION
- — — — INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

- ||||| DIKE
- SL STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WL WETLAND

Figure 3. Refined Metals Corp., September 6, 1950. Approximate scale 1:5,500.



JUNE 6, 1956 (FIGURE 4)

This photo shows the future location of the Refined Metals Corp. There are no significant changes to the site or the surrounding area since it was observed on the 1950 photography (Figure 3).





## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x FENCE
- STUDY AREA

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Figure 4. Refined Metals Corp., June 6, 1956. Approximate scale 1:7,000.



AUGUST 12, 1971 (FIGURE 5)

This photo shows the Refined Metals Corp. is a fully operational metal reclaiming facility. The site consists of one large multi-story processing building, two large single-story warehouse buildings, a probable heat processing building, and a well-lined holding pond. An opening in the pond's containment wall is visible and would direct any overflow southeast into Sloan Ditch. An open storage area containing drums and probable scrap metal is also present. No spillage is visible at the site.





## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- X-X-X-X FENCED SITE BOUNDARY
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### DRAINAGE

- DRAINAGE
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- ===== VEHICLE ACCESS
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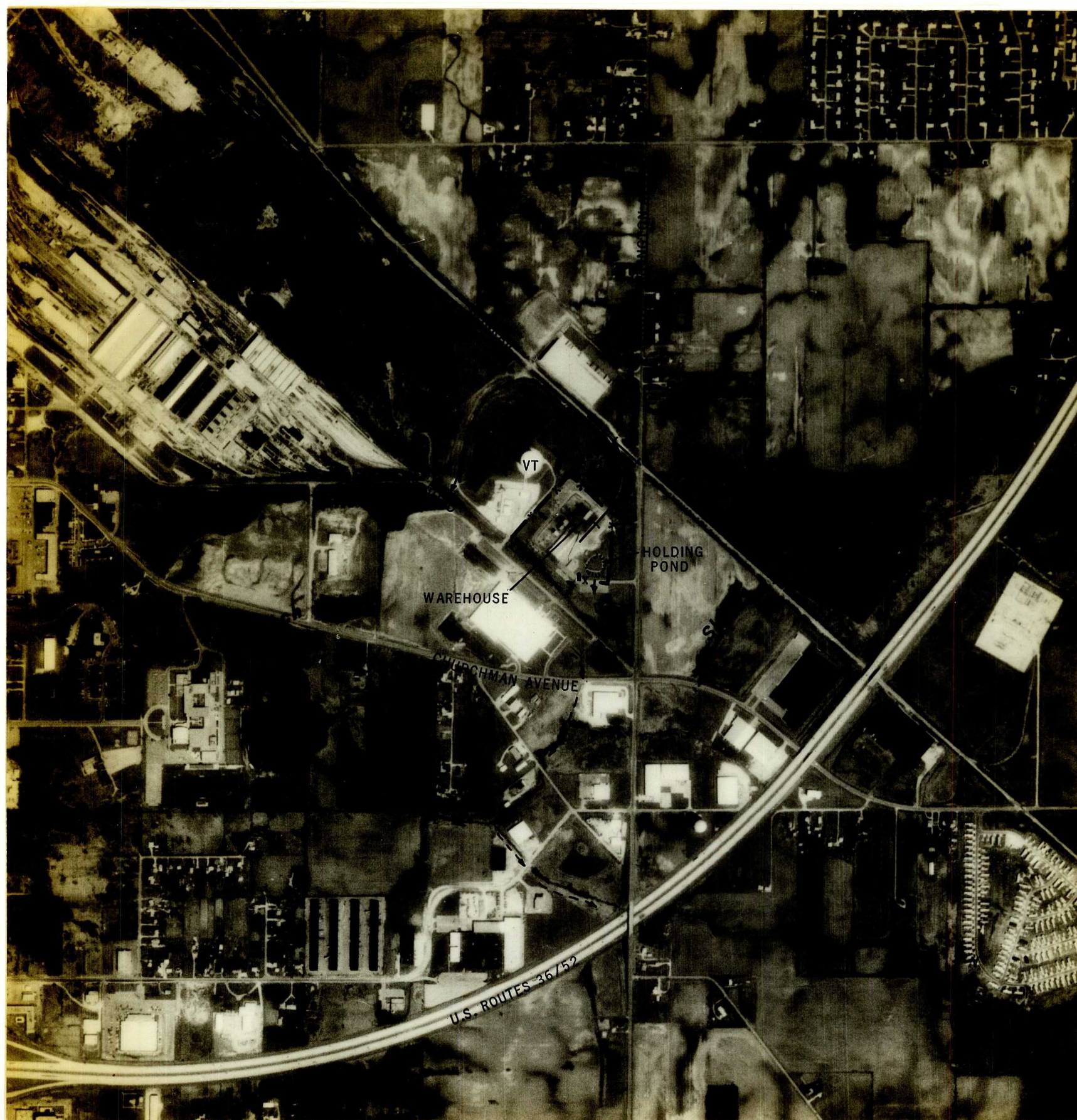
Figure 5. Refined Metals Corp., August 12, 1971. Approximate scale 1:5,300.



APRIL 16, 1983 (FIGURE 6)

This photo shows the Refined Metals Corp. is operational, although no specific activity is visible. The two warehouses previously identified on the 1971 photo (Figure 5) have become one structure. No open storage of drums or any other material is noted. No vehicles are visible at the site. No other significant changes are noted.





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- x-x-x-x FENCED SITE BOUNDARY
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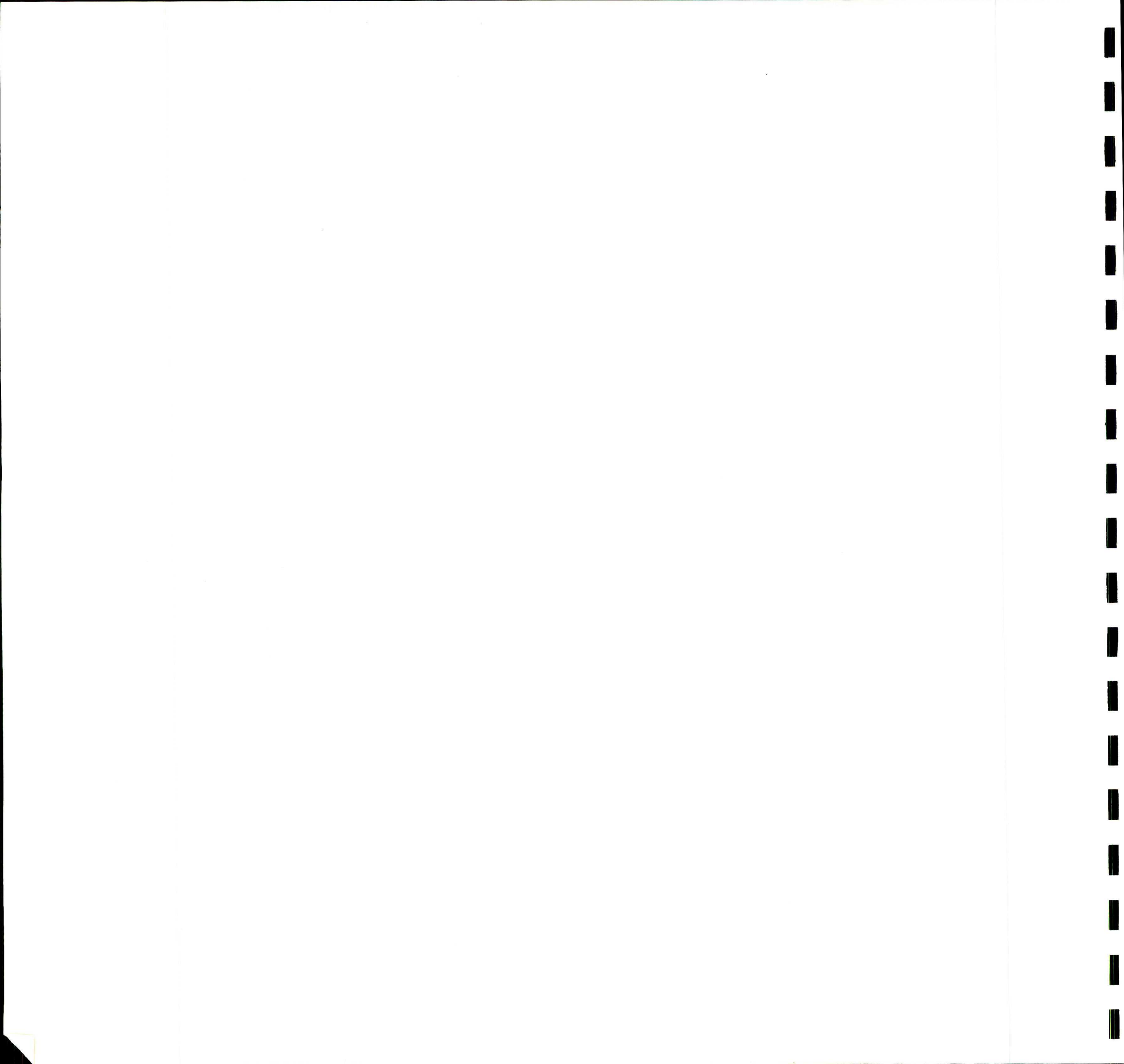
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Figure 6. Refined Metals Corp., April 16, 1983. Approximate scale 1:11,500.





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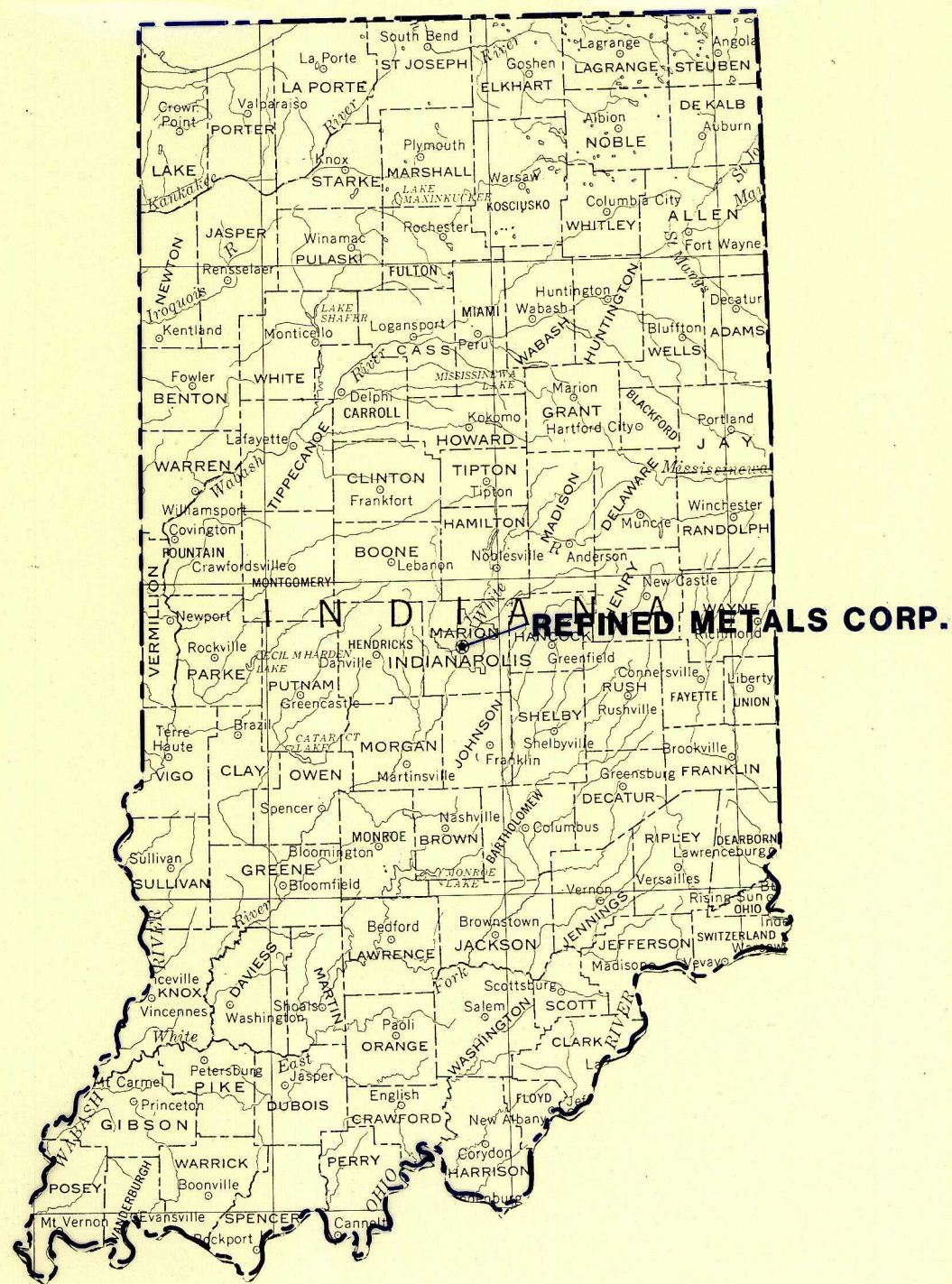
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UNITED STATES (1972)

Figure 1. Site location map, Indiana. Scale 1:2,500,000.



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†Film type identification:

B&W: Black-and-White

‡Photo source identification:

ASCS: U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service, Salt Lake City, Utah.



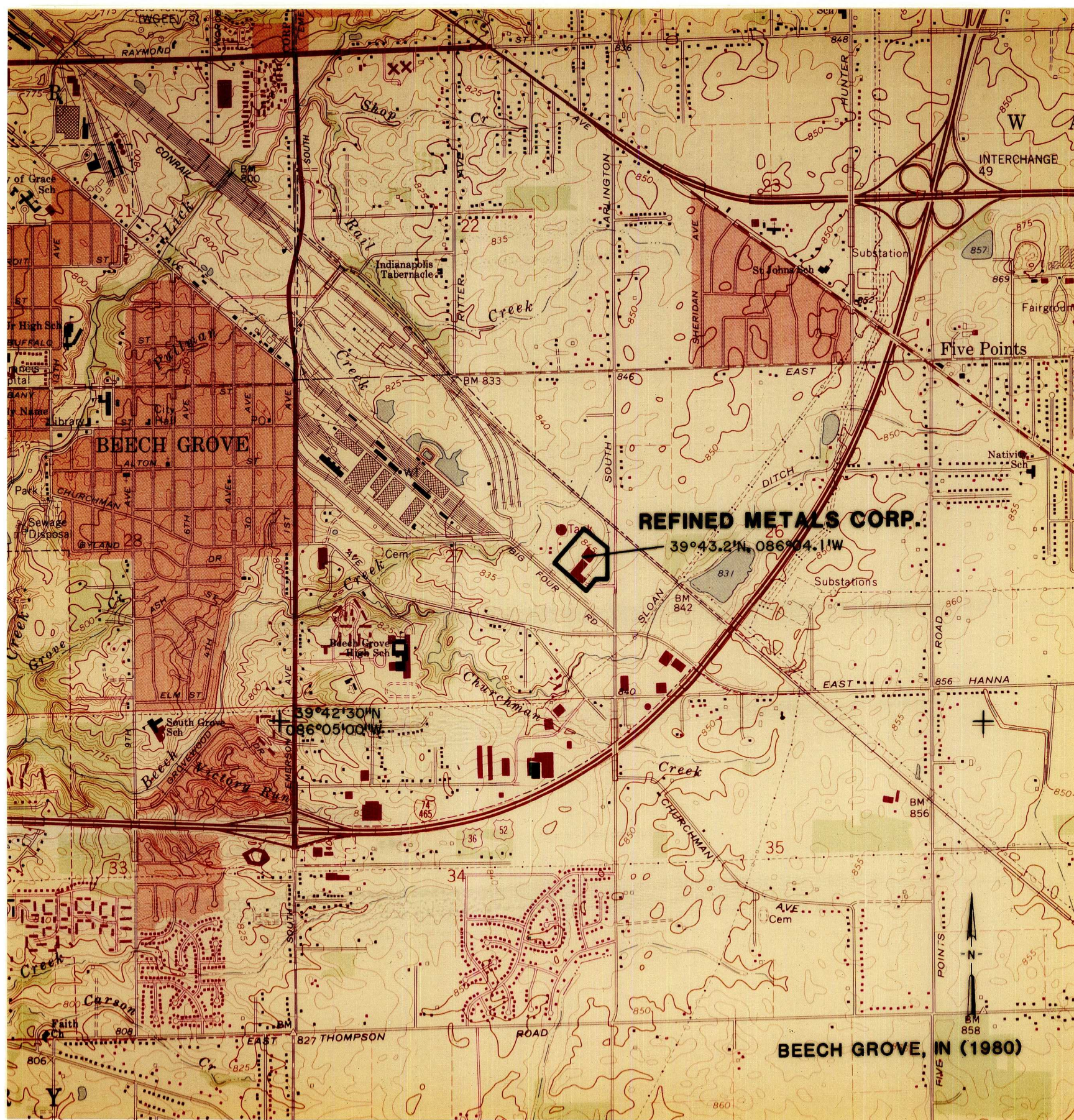


Figure 2. Local site location map, Indianapolis, Indiana. Scale 1:24,000.



#### ANALYSIS SUMMARY

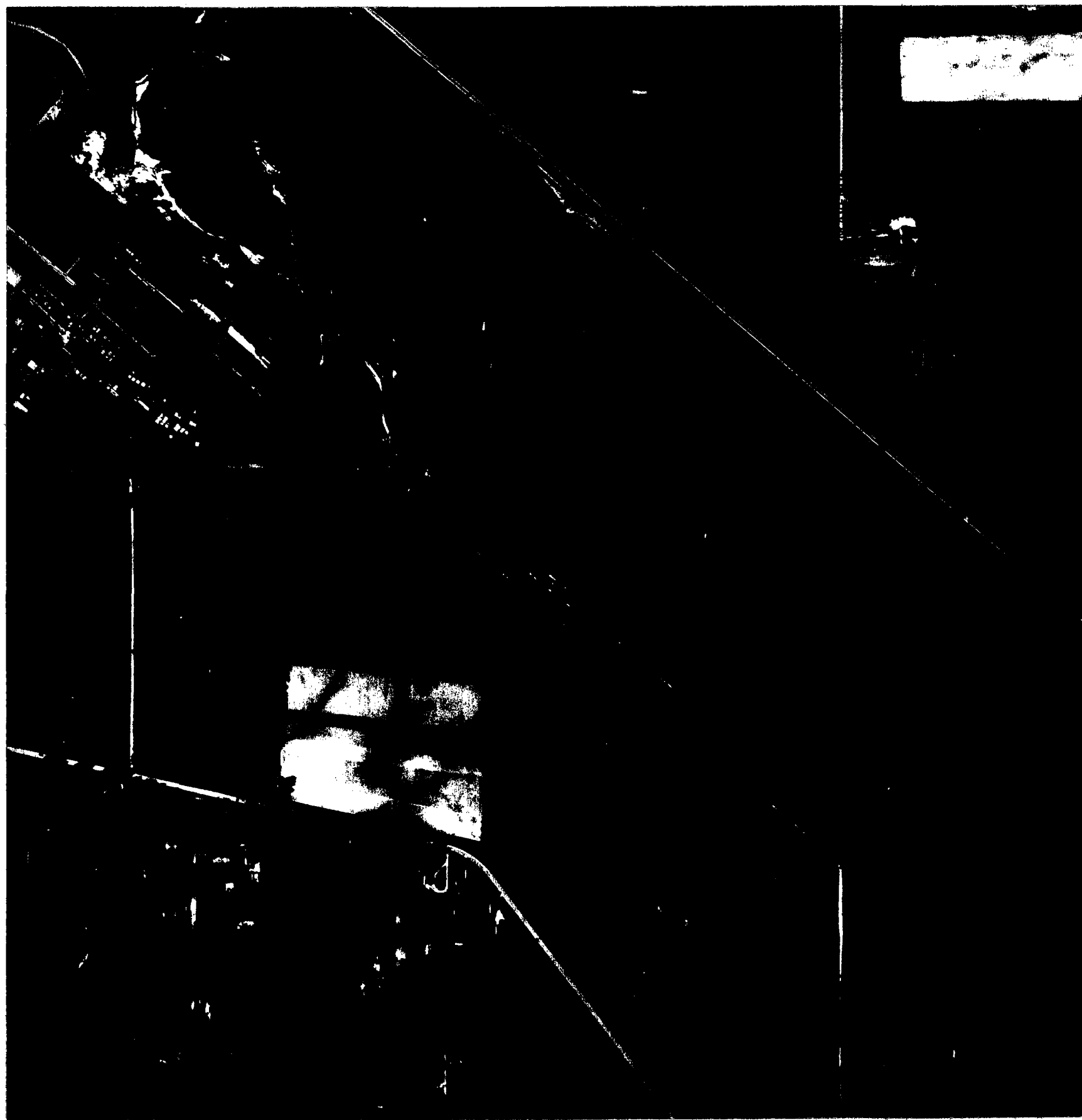
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The site is located on a slight hill near Beech Creek and Sloan Ditch but is not near any major waterways and would not be affected by a 100-year flood event.

## PHOTO ANALYSIS

SEPTEMBER 6, 1950 (FIGURE 3)

The photo shows the future location of the Refined Metals Corp. There are no facilities as yet at the site. The drainage in the area includes Sloan Ditch and Beech Creek which flow in a southwesterly direction.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- x-x-x-x FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- x x x x x FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

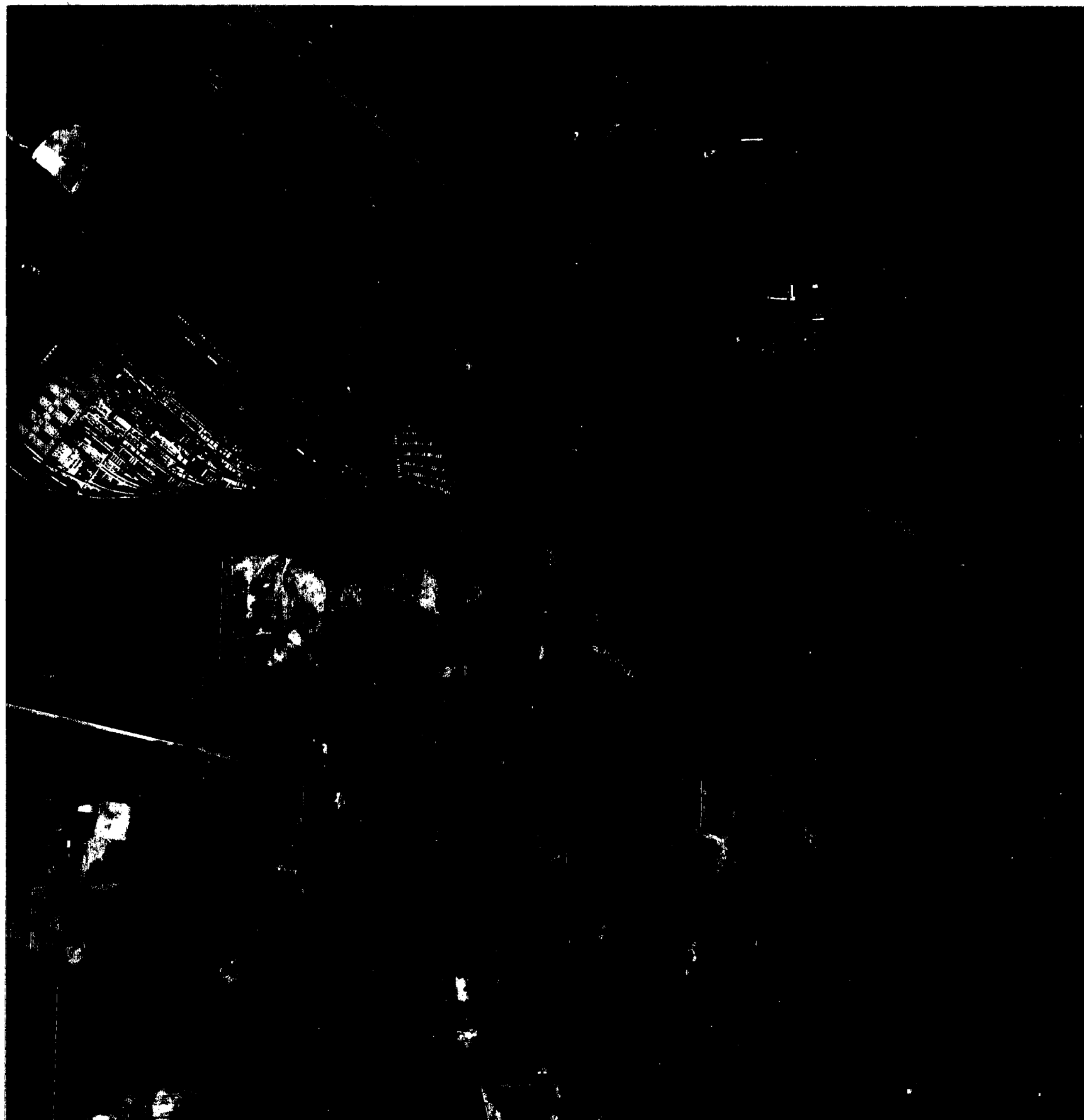
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Figure 3. Refined Metals Corp., September 6, 1950. Approximate scale 1:5,500.

JUNE 6, 1956 (FIGURE 4)

This photo shows the future location of the Refined Metals Corp. There are no significant changes to the site or the surrounding area since it was observed on the 1950 photography (Figure 3).





## INTERPRETATION CODE

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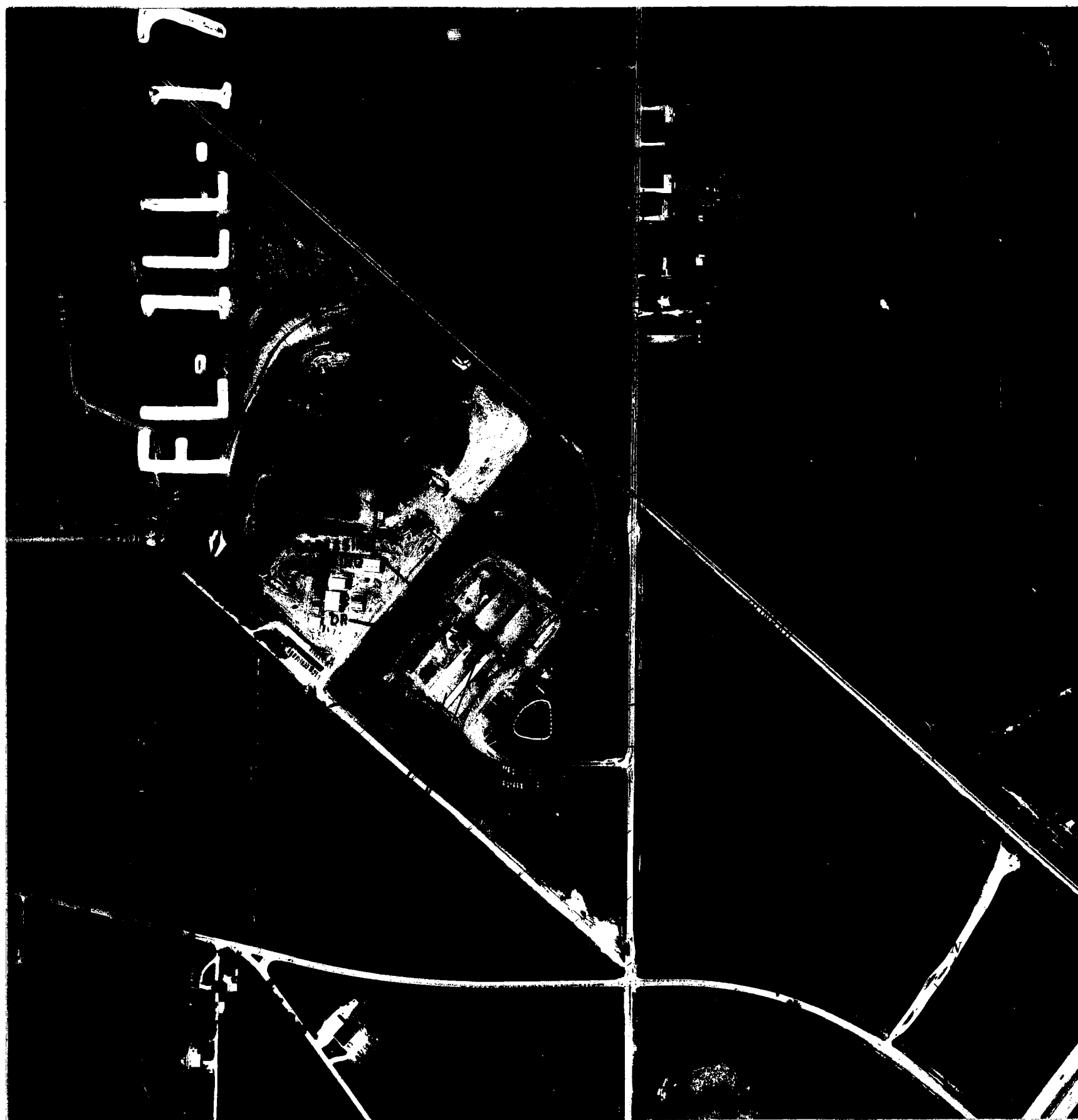
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- WD WASTE DISPOSAL AREA
- WL WETLAND

Figure 4. Refined Metals Corp., June 6, 1956. Approximate scale 1:7,000.

AUGUST 12, 1971 (FIGURE 5)

This photo shows the Refined Metals Corp. is a fully operational metal reclaiming facility. The site consists of one large multi-story processing building, two large single-story warehouse buildings, a probable heat processing building, and a well-lined holding pond. An opening in the pond's containment wall is visible and would direct any overflow southeast into Sloan Ditch. An open storage area containing drums and probable scrap metal is also present. No spillage is visible at the site.



## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- X-X-X FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- X X X X X FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- ← FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- + + + + + RAILWAY

### SITE FEATURES

- ||||| DIKE
- SL STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WL WETLAND

Figure 5. Refined Metals Corp., August 12, 1971. Approximate scale 1:5,300.

APRIL 16, 1983 (FIGURE 6)

This photo shows the Refined Metals Corp. is operational, although no specific activity is visible. The two warehouses previously identified on the 1971 photo (Figure 5) have become one structure. No open storage of drums or any other material is noted. No vehicles are visible at the site. No other significant changes are noted.





## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- X-X-X FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- X X X X X FENCE
- STUDY AREA

### DRAINAGE

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- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WL WETLAND

Figure 6. Refined Metals Corp., April 16, 1983. Approximate scale 1:11,500.



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
NATIONAL EXPOSURE RESEARCH LABORATORY  
ENVIRONMENTAL PHOTOGRAPHIC INTERPRETATION CENTER  
12201 SUNRISE VALLEY DRIVE • 555 NATIONAL CENTER • RESTON, VA 20192

May 20, 1999

OFFICE OF  
RESEARCH AND DEVELOPMENT

MEMORANDUM

SUBJECT: Historical Site Analysis for the Refined Metals Corporation

FROM: Joan L. Bozik, CSR *Joan L. Bozik*  
Environmental Photographic Interpretation Center  
Landscape Ecology Branch

TO: Jonathan Adenuga (DRE-9J)  
Environmental Scientist  
Region 5

Per your request, attached you will find two copies of a historical site analysis for the Refined Metals Corporation, Beech Grove, Indiana.

Eight dates of photography were used for this report covering a 1985 through 1998 time period.

To help us determine if we are meeting your needs, we request that you complete the attached Critique Sheet and return it in the pre-addressed envelope provided.

Thank you for taking the time to complete the Critique Sheet. Your answers/comments will help us serve you better in the future.

If you have any questions concerning the report, or if I can be of further assistance, please contact me at (703) 648-4288.

Attachments

cc: (w/o attachments)  
Walt Francis (DRE-9J)  
Donald Garofalo, LEB/EPIC

TS-PIC9905555R  
May 1999

AERIAL PHOTOGRAPHIC ANALYSIS  
REFINED METALS CORPORATION

Marion County, Indiana

by

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for

Environmental Services Division  
Lockheed Environmental Systems & Technologies Co.  
Las Vegas, Nevada 89119

Contract No. 68-C5-0065

Work Assignment Manager

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ENVIRONMENTAL SCIENCES DIVISION  
NATIONAL EXPOSURE RESEARCH LABORATORY  
OFFICE OF RESEARCH AND DEVELOPMENT  
U.S. ENVIRONMENTAL PROTECTION AGENCY  
LAS VEGAS, NEVADA 89193-3478



## NOTICE

This document has undergone a technical and quality control and assurance review and has been approved by personnel of the U.S. Environmental Protection Agency, Office of Research and Development, Environmental Sciences Division, Landscape Ecology Branch at Las Vegas, Nevada, and is for internal Agency use and distribution only.

## **ABSTRACT**

A historical aerial photographic analysis of the Refined Metals Corporation, located in Marion County, Indiana, was conducted to provide operational remote sensing support to field investigations of the U.S. Environmental Protection Agency (EPA) Region 5 under the Resource Conservation and Recovery Act (RCRA). The analysis was conducted to document waste disposal areas, staining, surface water bodies, drainage pathways, wetlands, and other observable activities and conditions of environmental significance at the site for the period from 1985 through 1998.

Eight dates of black-and-white, color, and color infrared aerial photographs were acquired, analyzed, and reproduced for this report. Significant onsite features identified by this analysis include horizontal and vertical tanks, open storage, light- and medium-toned mounded material, debris, and a holding pond with liquid. Significant offsite features include changes in drainage pathways and wetlands, by filling and excavating activities, and a pipe appearing to lead from an adjacent facility into Beech Creek.

The EPA Environmental Sciences Division, Landscape Ecology Branch in Las Vegas, Nevada, prepared this report for the EPA Waste, Pesticides and Toxics Division in Region 5, Chicago, Illinois, and the EPA Office of Solid Waste and Emergency Response in Washington, DC.

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## INTRODUCTION

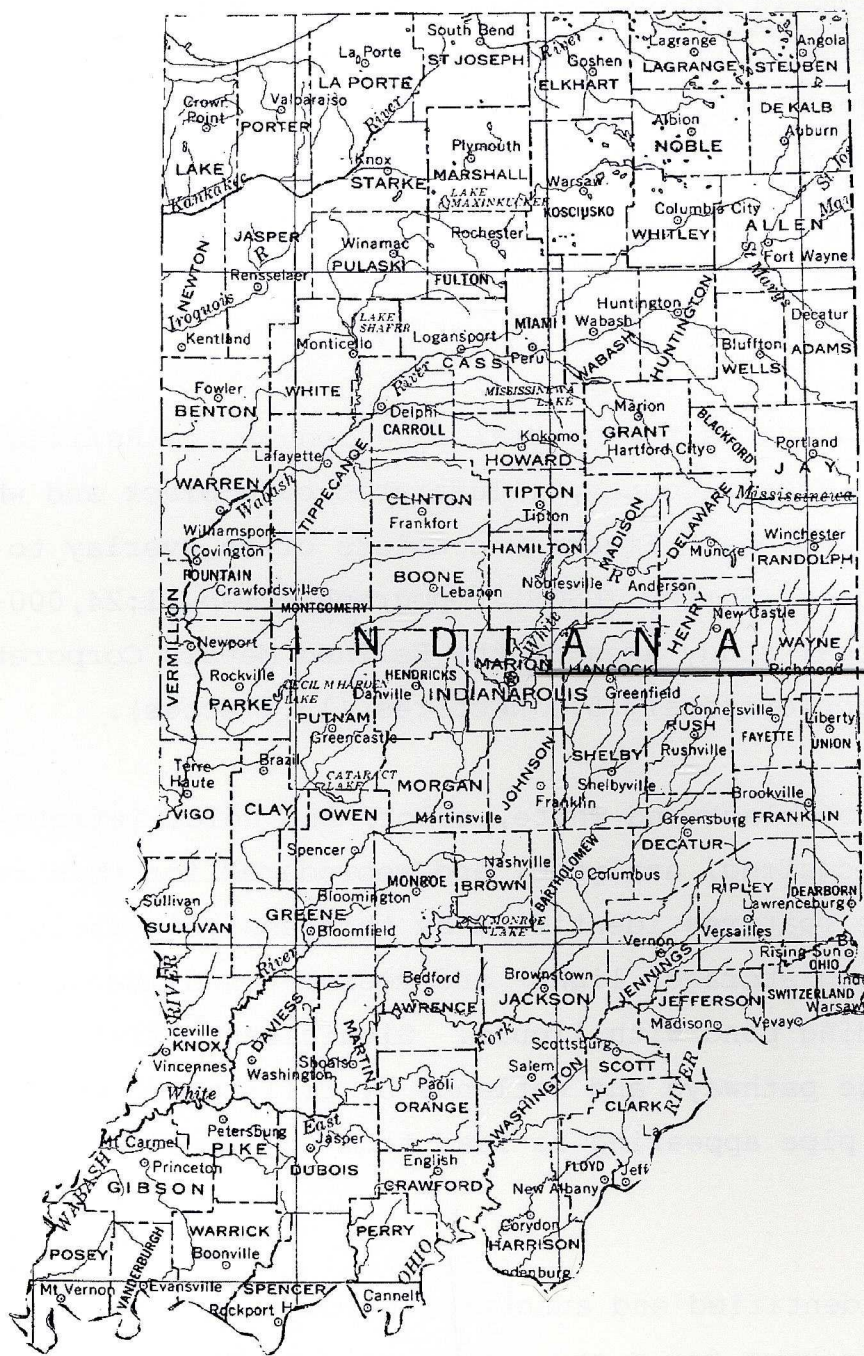
A historical aerial photographic analysis of the Refined Metals Corporation, located in Marion County, Indiana, was conducted to provide operational remote sensing support to field investigations of the U.S. Environmental Protection Agency (EPA) Region 5 under the Resource Conservation and Recovery Act (RCRA). The analysis was conducted to document waste disposal areas, staining, surface water bodies, drainage pathways, wetlands, and other observable activities and conditions of environmental significance at the site for the period from 1985 through 1998.

Figure 1 illustrates the general location of the Refined Metals Corporation within Marion County, illustrated on a black and white copy of a 1972 State map of Indiana. Figure 2 consists of an overlay to a color copy of a 1980 U.S. Geological Survey (USGS) topographic map, 1:24,000-scale, and illustrates the local study area of the Refined Metals Corporation Site. The site encompasses approximately 5.3 hectares (13.2 acres).

Eight dates of black-and-white, color, and color infrared aerial photographs were acquired, analyzed, and reproduced for this report. Significant onsite features identified by this analysis include horizontal and vertical tanks, open storage, light- and medium-toned mounded material, debris, and a holding pond with liquid. Significant offsite features include changes in drainage pathways and wetlands by filling and excavating activities, and a pipe appearing to lead from an adjacent facility into Beech Creek.

Stains are identified and annotated throughout the analysis when they are visible. The source for a stain will only be discussed or annotated when it can be determined.





UNITED STATES  
(1972)

REFINED METALS CORPORATION

FIGURE 1  
REFINED METALS CORPORATION

STUDY AREA LOCATION MAP  
MARION COUNTY, INDIANA

APPROX. SCALE 1:2,500,000



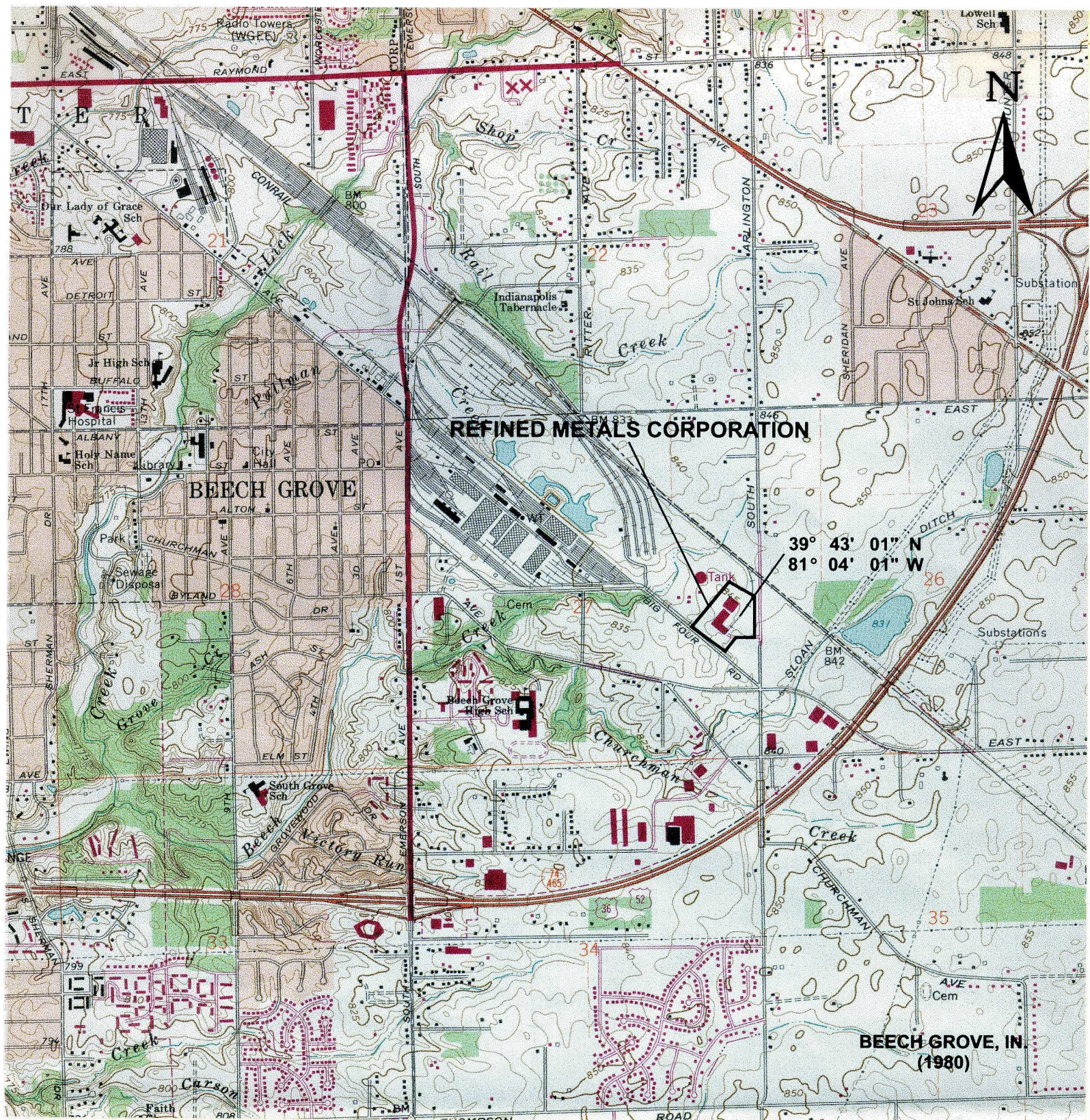


FIGURE 2  
REFINED METALS CORPORATION

LOCAL STUDY AREA LOCATION MAP  
BEECH GROVE, INDIANA  
USGS QUAD

APPROX. SCALE 1:24,000



Surface water bodies, drainage pathways, and wetlands analysis were performed using the 1985 and the 1998 photographs for a one-eighth-mile radius of the Refined Metals Corporation site. Significant changes in surface water bodies, drainage pathways, and wetlands identified on intermediate years of aerial photographs are annotated on the digital print enlargements for those years. The surface water bodies, drainage, and wetlands analysis begins the text for each year of analysis in 1985 and 1998 as well as for intermediate years when changes have occurred.

A glossary, defining features or conditions identified in this report, follows the Analysis section. Sources for all maps, aerial photographs, and collateral data used in this report are listed in the References section. A list of all aerial photographs that were identified and evaluated for potential application to this study can be obtained by contacting the EPA Work Assignment Manager.

The EPA Environmental Sciences Division, Landscape Ecology Branch in Las Vegas, Nevada, prepared this report for the EPA Waste, Pesticides and Toxics Division in Region 5, Chicago, Illinois, and the EPA Office of Solid Waste and Emergency Response in Washington, DC.

## METHODOLOGY

This report was prepared using a standard methodology that includes the following steps:

- data identification and acquisition,
- photographic analysis and interpretation, and
- graphics and text preparation.

These steps are described in this section. Subsections also address details related to specific kinds of analyses that may be required to identify environmental features such as surface drainage and wetlands. All operational steps and processes used to perform this work (including data identification and acquisitions; photographic analysis and interpretation; and graphics and text preparation) adhere to strict QA/QC guidelines and standard operating procedures (SOPS). These guidelines and procedures are documented in the Master Quality Assurance Project Plan (QAPP) for the Remote Sensing Technical Support Contract, 68-C5-00065 (LESAT 1998).

Data identification and acquisition included a search of government and commercial sources of historical aerial photographs to identify and obtain photography with optimal spatial and temporal resolution and image quality for the study area. In addition, U.S. Geological Survey (USGS) topographic maps were obtained to show the study area location and to provide geographic and topographic context.

To conduct this analysis, the analyst obtained diapositives (transparencies) of historical aerial photographs showing the study area. Diapositives are most often used for analysis instead of prints because the diapositives have superior photographic resolution. They show minute details

of significant environmental features that may not be discernible on a paper print.

A photographic analyst uses a stereoscope to view adjacent, overlapping pairs of diapositives on a backlit light table. In most cases, the stereoscope is capable of various magnifications up to 60 power. Stereoscopic viewing involves using the principle of parallax (observing a feature from slightly different positions) to observe a three-dimensional representation of the area of interest. The stereoscope enhances the photo interpretation process by allowing the analyst to observe vertical as well as horizontal spatial relationships of natural and cultural features.

The process of photographic analysis involves the visual examination and comparison of many components of the photographic image. These components include shadow, tone, color, texture, shape, size, pattern, and landscape context of individual elements of a photograph. The photo analyst identifies objects, features, and "signatures" associated with specific environmental conditions or events. The term "signature" refers to a combination of components or characteristics that indicate a specific object, condition, or pattern of environmental significance. The academic and professional training, photo interpretation experience gained through repetitive observations of similar features or activities, and deductive logic of the analyst as well as background information from collateral sources (e.g., site maps, geologic reports, and soil surveys) are critical factors employed in the photographic analysis.

The analyst records the results of the analysis by using a standard set of annotations and terminology to identify objects and features observed in the diapositives. Significant findings are annotated on overlays attached to the photographs in the report and discussed in the accompanying text. Annotations that are self-explanatory may not be discussed in the text. The



annotations are defined in the legend that accompanies each photograph and in the text when first used.

Objects and features are identified in the graphics and text according to the analyst's degree of confidence in the evidence. A distinction is made between certain, probable, and possible identifications. When the analyst believes the identification is unmistakable, no qualifier is used. Probable is used when a limited number of discernible characteristics allows the analyst to be reasonably certain of a particular identification. Possible is used when only a few characteristics are discernible and the analyst can only infer an identification.

The prints presented in this report have been reproduced, either by photographic or computer methods, from the original film. Reproductions are made from the original film and may be either contact (the same size) prints or enlargements, depending on the scale of the original film. Any computer-produced prints used in this report are generated from scans of the film at approximately 1,300 dots per inch (dpi) and printed at 720 dpi. Although the reproductions allow effective display of the interpretive annotations, they may have less photographic resolution than the original film. Therefore, some of the objects and features identified in the original image and described in the text may not be clearly discernible on the prints in this report.

Study area boundaries shown in this report were determined from aerial photography or collateral data and do not denote legal property lines or ownership.

#### Surface Drainage

The surface drainage analysis produced for this report identifies the direction and potential path that a liquid spill or surface runoff would

follow based on the topography of the terrain and the presence of discernible obstacles to surface flow. The analyst determines the direction of surface drainage by stereoscopic analysis of the aerial photographs and by examining USGS topographic maps. Site-specific surface drainage patterns are annotated on the map or photo overlay. Where the direction of subtle drainage cannot be determined, an indeterminate drainage line symbol is used. Regional surface flow is ascertained from the USGS topographic maps.

#### Color Infrared Photography

Color infrared film has been reproduced for the 1998 photographs (Figure 10). Normal color film records reflected energy in the blue, green, and red portions of the electromagnetic spectrum. Color infrared film differs in that it is sensitive not only to reflected blue, green, and red energy, but also to reflected energy in the infrared portions of the electromagnetic spectrum; however, the blue energy is filtered out and only the green, red and infrared energy is recorded. When color infrared film is processed, it displays "false" colors that do not correspond with the true colors of the features photographed. For example, features that are highly reflective in the infrared portion of the spectrum, such as healthy green vegetation, appear red to magenta on color infrared film. The false color displayed by a feature is produced in accordance with the proportions of infrared, green, and red energy it reflects. These proportions are referred to as the feature's "spectral reflectance characteristics." To interpret the true color of a particular feature accurately from color infrared film, a knowledge of the spectral reflectance characteristics of that feature is required. This information is not readily available for the majority of features identified in this report. Therefore, unless otherwise indicated, no attempt is made to interpret the true colors of the features identified on the color infrared film analyzed for this report.

## PHOTO ANALYSIS

**April 24, 1985 (FIGURE 3)**

### Drainage Analysis

Photographic prints were used in the 1985 analysis because diapositives were not available. Northwest of the Refined Metals Corporation site a wetland area is visible. North of the site a series of channelized drainages flow into Beech Creek. A wetland is visible at the origin of the northernmost of these channelized drainages. A pipe or outfall, appearing to originate from the facility immediately west of the Refined Metals Corporation site, extends into Beech Creek. South of the pipe two channelized drainages flow west towards Beech Creek, although no above-ground connection to Beech Creek is visible at this time.

According to the United States Geological Survey (USGS) topographic map, Beech Creek is an intermittent stream as it passes southwest of the Refined Metals Corporation site. Two small wetlands are visible immediately outside the northeastern boundary of the Refined Metals Corporation site. A drainage extends south from a holding pond (EPA 1998) located in the southeastern portion of the Refined Metals Corporation site. A channelized drainage is visible adjacent to a wetland southeast of the site. The direction of flow of the drainage is to the south toward Churchman Creek.

Southwest of the site and north of Churchman Avenue four channelized drainages flow into an unnamed south-flowing intermittent stream. East of the Refined Metals Corporation site a small pond drains into the southwest flowing Sloan Ditch. Further south, two channelized drainages flow into Sloan Ditch. Sloan Ditch flows into Churchman Creek south of the Refined Metals Corporation site. Churchman Creek flows into Beech Creek approximately three-quarters of a mile southwest of the site (not visible on this photograph).





FIGURE 4  
REFINED METALS CORPORATION

MARCH 22, 1986  
15

APPROX. SCALE 1:5,400



### Site Analysis

The Refined Metals Corporation facility is surrounded by a perimeter fence that corresponds to the site boundary as illustrated on this photograph. The perimeter fence remains unchanged throughout the remainder of this analysis and will continue to be illustrated by the site boundary symbol but not further discussed. Light-toned (LT) mounded material (MM) is visible in the northern portion of the site. A stain (ST) and a probable stain are visible onsite near buildings (none annotated) in the northwestern and southeastern portions of the site, respectively. In the western portion of the site an area of disturbed ground (DG) is visible and may be a result of construction activities. The holding pond in the southeast portion of the site contains liquid (LQ). Along the northeastern site boundary three horizontal tanks (HT) are visible. These tanks remain unchanged throughout this analysis and will be annotated in the future but not further discussed.

**March 22, 1986 (FIGURE 4)**

The channelized drainages northwest of the Refined Metals Corporation site have been rerouted and filled to accommodate the construction of a new building (not annotated). East of the site one of the two small wetlands seen in 1985 appears to be enlarged by probable excavation (EX) activities.

Light-toned mounded material remains in the northern portion of the site. A stained area remains visible near buildings (not annotated) in the northwestern portion of the site. This area of staining is larger than in 1985. The probable stain, seen in 1985 is no longer visible. A stain is visible in the northeastern corner of the site near the rail spur (not annotated). In the southern portion of the site a stain is visible along an access road (not annotated). The disturbed ground seen in the western portion of the site in 1985 has been graded and is now vegetated. Medium-toned (MT) mounded material is visible alongside a building (not annotated) near the center of the Refined Metals Corporation site. The holding pond with liquid in the southeast portion of the site remains.





FIGURE 5  
REFINED METALS CORPORATION

JUNE 21, 1989  
17

APPROX. SCALE 1:5,400



**June 21, 1989 (FIGURE 5)**

Staining remains visible near buildings in the northwestern portion of the site. Areas of probable staining are also visible in the northeast and southwest portions of the site. A new building (NB) is visible in the northern portion of the site where light-toned mounded material was observed in 1986. South of the new building a possible horizontal tank is visible. A structure (S), appearing to be related to production activities is visible near the center of the site where medium-toned mounded material was seen in 1986. A large vertical tank (VT) is visible alongside a building (not annotated) near the center of the site. Several containers (C) are visible in the southwest portion of the site. In the southeastern portion of the site the holding pond with liquid remains. Southeast of the Refined Metals Corporation site an area of ground scarring (GS) is visible.



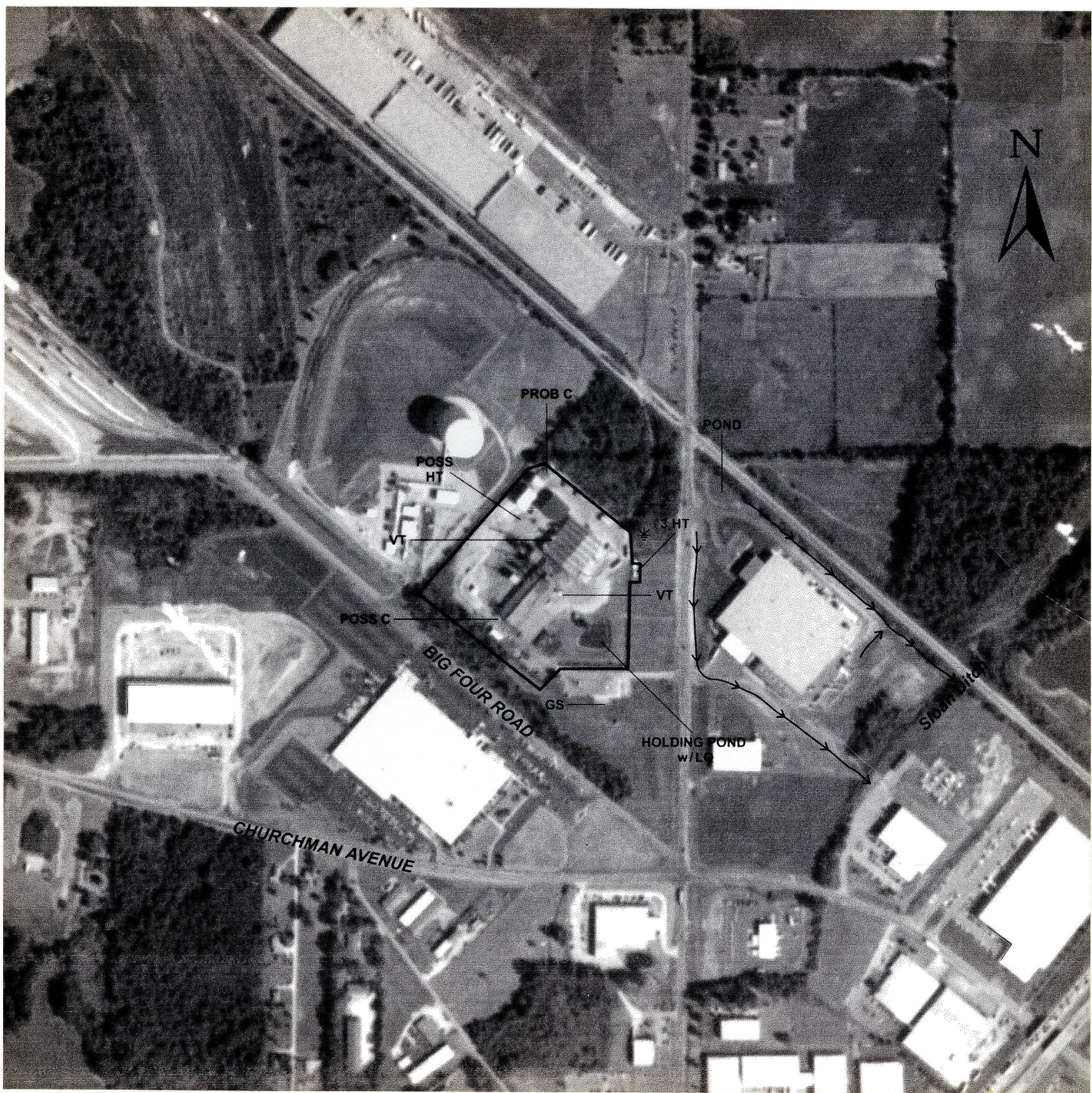


FIGURE 6  
REFINED METALS CORPORATION

AUGUST 3, 1991  
19

APPROX. SCALE 1:5,400



**August 3, 1991 (FIGURE 6)**

A pond, excavated since 1989, is visible northeast of the Refined Metals Corporation site. A new (or reworked) channelized drainage leads southeast from the pond and flows into Sloan Ditch. Southwest of the aforementioned drainage an additional new channelized drainage is visible. This drainage also flows into Sloan Ditch. Outside the northeast corner of the site, where two small wetlands were visible in 1989, one contiguous wetland is now visible.

The probable stain and stain seen in the northern portion of the site in 1989 are no longer visible. The possible horizontal tank seen in the northern portion of the site remains. Nearby, a large vertical tank is visible alongside a building (not annotated). The large vertical tank, first seen in 1989, remains near the center of the site. The containers seen in the southern portion of the site in 1989 are no longer visible. Also in the southern portion of the site, an area of possible containers is visible alongside a building (not annotated). The probable stain seen in the southwest portion of the site in 1989 is no longer visible. The holding pond with liquid remains in the southeast portion of the site. Southeast of the Refined Metals Corporation site the area of ground scarring remains.



FIGURE 6  
REFINED METALS CORPORATION

AUGUST 3, 1991

APPROX. SCALE 1:5,400



**January 30, 1993 (FIGURE 7)**

West of the refined Metals Corporation site a portion of Beech Creek and a nearby channelized drainage have been filled. Beech Creek is now rerouted through the channelized drainage located immediately to the north of the aforementioned drainages.

The 1993 photograph has excellent resolution. An area of probable containers is visible in the northwest portion of the site. These probable containers are unchanged throughout the remainder of this analysis. These probable containers will be annotated in the future but no longer discussed.

A large horizontal tank, surrounded by a probable fence (not annotated), is visible in the northwest portion of the site. A possible horizontal tank was noted in this location in 1991. A stain or liquid emanates from within the fenced area. Two concentrations of containers are visible east of the horizontal tank. Staining or liquid is visible near the westernmost area of containers. Immediately south of the containers a new vertical tank is visible. An area of light-toned mounded material and debris (DB) and an area of medium-toned mounded material or debris are visible in the northwest portion of the site. A stain is visible next to a large piece of equipment (not annotated) in the west central portion of the site. East of this stain, probable pipes are visible extending north from a small structure (not annotated). In the center of the facility rows of large probable containers are visible. To the east, the large vertical tank first seen in 1991 remains.

In the west central portion of the site an area of open storage containing varying sized (possibly metal) objects (not annotated), and four probable vertical tanks (not annotated) is seen. Scattered objects are visible in the western portion of the open storage area. An open storage area containing scattered objects (not annotated) is visible in the south central portion of the site. In the southeast corner of the site two pipelines are





FIGURE 7  
REFINED METALS CORPORATION

JANUARY 30, 1993  
21

APPROX. SCALE 1:5,500



visible leading to the holding pond. These pipelines will continue to be annotated, but no longer discussed for the remainder of the analysis. Southeast of the site the ground scar seen in 1991 appears vegetated and will not be annotated or discussed in the future. South of the site a possible failing leach field is visible.

**December 4, 1995 (FIGURE 8)**

South of the Refined Metals Corporation site a portion of a wetland and a section of a channelized drainage have been filled (FA). This activity appears to be a result of nearby road construction activities.

The large horizontal tank seen in the northwest corner of the site remains. The stain or liquid that was seen near the horizontal tank in 1993 is no longer visible. The stain or liquid, stored containers, and large vertical tank located in the northern portion of the site in 1993 are no longer visible. The area of light-toned mounded material and debris, located in the northwest portion of the site, has increased in size since 1993. An area of medium-toned mounded material and debris, first seen in 1993, in the western portion of the site remains. The rows of large probable containers, located near the center of the site in 1993, are no longer visible. The large vertical tank, also located near the center of the site, remains.

Six probable vertical tanks are visible in the southwest portion of the site. The stain seen in the southwest corner of the site in 1993 is no longer visible. The scattered objects, present along the southern border of the site in 1993, are no longer visible. An open storage area remains visible near the south central portion of the site. The holding pond with liquid remains visible in the southeast portion of the site. No signatures are detected in this year's photograph of the possible failing leach field seen southeast of the site in 1993.





FIGURE 8  
REFINED METALS CORPORATION

DECEMBER 4, 1995  
25

APPROX. SCALE 1:5,400



**April 15, 1997 (FIGURE 9)**

Two new ponds are visible south and southeast of the Refined Metals Corporation site.

The large horizontal tank located in the northern portion of the site remains. A stain emanates from the location of the horizontal tank. Adjacent to the tank the light-toned mounded material and debris remain. Two areas of liquid are visible near the edge of a large building (not annotated) in the northeast portion of the site. In the western portion of the site a graded area (not annotated) covered by vegetation is visible where medium-toned mounded material and debris were noted in 1995. The large vertical tank, seen alongside a building (not annotated) near the center of the site in 1995, is no longer visible. Six probable vertical tanks remain visible in the south central portion of the site.

A domed structure (DS) is the only remaining feature in the open storage (not annotated) area located in the south central portion of the site. South of the domed structure a probable stain or liquid is visible next to a vehicle (not annotated). In the southeast corner of the site the holding pond with liquid remains.





FIGURE 9  
REFINED METALS CORPORATION

APRIL 15, 1997  
27

APPROX. SCALE 1:5,300

**December 30, 1998 (FIGURE 10)**

Drainage Analysis

North of the Refined Metals Corporation site a series of channelized drainages flow south into Beech Creek in a configuration similar to that seen in 1985 with the exception of a short drainage ditch that has been filled and another channelized drainage that was extended to the northwest to accommodate new buildings. The wetland north of these ditches remains. North of the site channelized drainages are visible on both sides of the railroad. These drainages flow into another channelized drainage, identified in 1985, which flows west into Beech Creek. A pipe leading into Beech Creek and appearing to originate from the site immediately west of the Refined Metals Corporation remains.

South of Big Four Road, Beech Creek has been rerouted by filling and the excavation of a new channelized drainage. Immediately to the east only one of the two channelized drainages that flowed west towards Beech Creek is visible in this year's photograph. No aboveground connection is visible between this drainage and Beech Creek.

Northeast of the Refined Metals Corporation site a new pond is visible. A new (or reworked) channelized drainage flows southeast from this pond into Sloan Ditch. South of the aforementioned drainage an additional channelized drainage flowing south and east into a pond is visible. This pond also appears to drain into Sloan Ditch. On the eastern edge of the site one wetland is visible where two smaller ones were seen in 1985. The holding pond onsite contains wetland vegetation (VEG). Channelized drainages flow east and south from the vicinity of the holding pond. A portion of a channelized drainage and a portion of a wetland have been filled north of Churchman Avenue. The channelized drainage continues south from the remaining wetland through an underground culvert (not annotated) at Churchman Avenue.





FIGURE 10  
REFINED METALS CORPORATION

DECEMBER 30, 1998

APPROX. SCALE 1:5,300



Southwest of the site two of the four channelized drainages seen previously north of Churchman Avenue remain. Aboveground connections are not visible from these drainages due to development. South of the site another small pond drains into Sloan Ditch. Further south on Sloan Ditch another pond is visible. Churchman Creek, which is located out of the study area, flows into Beech Creek southwest of the Refined Metals Corporation site.

#### Site Analysis

In this year's photographs recent precipitation is apparent. In the northern portion of the site possible liquid or staining is visible. In the northwestern portion of the site the horizontal tank and the light-toned mounded material and debris remain. In the eastern portion of the site one of the two areas of liquid seen in parking areas in 1997 remains. Only one of the probable vertical tanks previously seen near the south central portion of the site remains. The probable stain or liquid seen near the south central portion of the site is no longer visible. In the southeast corner of the site the holding pond with liquid remains. Immediately southeast of the Refined Metals Corporation, near a parking area, a probable pipe is visible. The domed structure remains visible in the open storage area located in the south central portion of the site.



## GLOSSARY

Building - (B) A relatively permanent, essentially boxlike construction having a roof. (NB) Building added since last photo coverage.

Channelized Drainage - A man-made or altered draining route.

Container (C) - Any portable device in which material is stored, transported, handled, or disposed.

Dark, Medium, Light-Toned (DK, MT, LT) - Tones of features in question are compared with the darkest and lightest tones of gray (if using B&W photography) on the print.

Debris (DB) - The remains of anything that can be identified as being broken down, destroyed, demolished, or dismantled.

Disturbed Ground (DG) - A rough area where the ground surface has been dug up or overturned.

Ditch - A long narrow excavation, as for draining or irrigating.

Excavation Area (EX) - An area where earth or other material is being removed in order to alter the ground level (e.g., building construction).

Fence (F) - Man-made obstructive structure which regulates access in or out of a site, area, etc.

Fill Area (FA) - An area where material is being deposited to fill a depression; or area where materials have been added, altering the elevation of the ground surface.

Ground Scar (GS) - An area where the surface of the ground has been leveled or altered by a vehicle pulling or pushing a wide blade.

Liquid (LQ) - Used when discussing impoundments, lagoons, catchment basins, or features that contain a liquid or when discussing discharge from outfalls, at storm drains, or tank trucks.

Material (M) - Raw or waste materials on or in the vicinity of the site.

Mounded Material (MM) - Piles of raw or waste materials on or in the vicinity of the site.

New Building (NB) - A building added since the last photo coverage.

Open Storage Area (OS) - An area of open-air storage (outdoor), storage of containerized, raw or waste materials, within industrial or manufacturing sites.

Outfall (OF) - The place where an effluent is discharged into the environment.

Pond - A small body of liquid, natural or man-made (e.g., farm pond), that does not appear to be directly related to disposal, treatment or activity on the site.

Stain (ST) - A residue or discoloration resulting from a spill, discharge, or removed/dispersed materials.

Tanks - Vertical tanks (VT), horizontal tanks (HT), pressure tanks (PT), tank farms, and solids waste management units. A large receptacle, container, or structure for holding liquid or gas.

Wetlands - Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.



## REFERENCES

### MAPS

Source	Figure	Name	Scale	Date
USGS <sup>1</sup>	1	United States	1:2,500,000	1972
USGS	2	Beech Grove, Indiana	1:24,000	1980

### PUBLICATIONS

Aerial Photographic Analysis of the Refined Metals Corp. Indianapolis, Indiana. May 1988.  
TS-AMD-87615-25. USEPA, Environmental Monitoring Systems Laboratory, Las Vegas,  
Nevada.

EPA 1998. Statement of Work Refined Metals Corp. Contract Number 68-C5-0065 (DCN 99-94-01-  
4) with facility map and collateral data supplied by EPA Region 5 as attached to EPIC  
Remote Sensing Services Request Form 10/22/98. 7pp.

LESAT (Lockheed Environmental Systems & Technologies Co.). 1998.  
Master Quality Assurance Project Plan. Prepared for EPA Environmental Sciences  
Division. Contract 68-C5-0065 (DCN 99-94-01-4). Las Vegas, Nevada.

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<sup>1</sup> United States Geologic Survey, Department of the Interior

# AERIAL PHOTOGRAPHS

Photo source	Figure	Date of acquisition	Original scale	Film type*	Photo I.D.	Source frame #
INDOT <sup>2</sup>	3	04-24-85	1:24,000	B&W	49	7:105-107
FC <sup>3</sup>	4	03-22-86	1:36,000	B&W		
FC	5	06-21-89	1:36,000	B&W	Marion County	6:21, 22
FC	6	08-03-91	1:36,000	B&W	Marion County	
AAS <sup>4</sup>	7	01-30-93	1:9,600	B&W	9211302	27:18,19
AAS	8	12-04-95	1:9,600	B&W	9503311	16:25,27
AAS	9	04-15-97	1:9,600	B&W	9703305	16:29-31
EPA <sup>5</sup>	10	12-30-98	1:6,000	CIR CC		1:1-4 2:1-4

\*Film type identification:

B&W: Black-and-white

CIR: Color Infrared

CC: Conventional Color

<sup>2</sup> Indiana Department of Transportation, Indianapolis, IN

<sup>3</sup> Fairchild National, Inc., Pinson, AL

<sup>4</sup> Atlantic Aerial Surveys, Inc., Indianapolis, IN

<sup>5</sup> U.S. Environmental Protection Agency



**LEGEND**

B	- BUILDING
C	- CONTAINER(S)
DB	- DEBRIS
DG	- DISTURBED GROUND
DS	- DOMED STRUCTURE
EX	- EXCAVATION
FA	- FILL AREA
GA	- GRADED AREA
GS	- GROUND SCAR
HT	- HORIZONTAL TANK
LF	- LEACH FIELD
LT	- LIGHT-TONED
LQ	- LIQUID
MM	- MOUNDED MATERIAL
MT	- MEDIUM-TONED
NB	- NEW BUILDING
O	- OBJECT(S)
OS	- OPEN STORAGE
S	- STRUCTURE
ST	- STAIN
VEG	- VEGETATED/VEGETATION
VT	- VERTICAL TANK

→→	- CHANNELIZED DRAINAGE
---→	- DRAINAGE
+ + + +	- RAILROAD
————	- SITE BOUNDARY
≠	- WETLANDS

TS-AMD-87615-12  
November 1987

AERIAL PHOTOGRAPHIC ANALYSIS OF REFINED METALS CORP.

Indianapolis, Indiana

by

L. G. Ogiela  
Environmental Programs  
Lockheed Engineering and Management Services Company, Inc.  
Las Vegas, Nevada 89193-3478

Contract No. 68-03-3245

Project Officer

J. L. Jack  
Advanced Monitoring Systems Division  
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## ABSTRACT

This report presents a current analysis of the Refined Metals Corp. facility in Indianapolis, Indiana. Current aerial photography dated September 4, 1987 was used to perform the analysis. These analyses were performed to monitor physical conditions and activities that could lead to the contamination of the surrounding environment, specifically surface and/or ground water.

The site, fully operational, consists of processing buildings, a warehouse, office, and open storage areas. A large amount of scrap metal was noted throughout the facility. Groups of drums and mounded material were also observed. Spillage from the processing area appeared to be entering a drainage channel that exits the site and a lined holding pond appeared to be breached. This spillage and possible discharge from the pond may be a potential source of off-site contamination.

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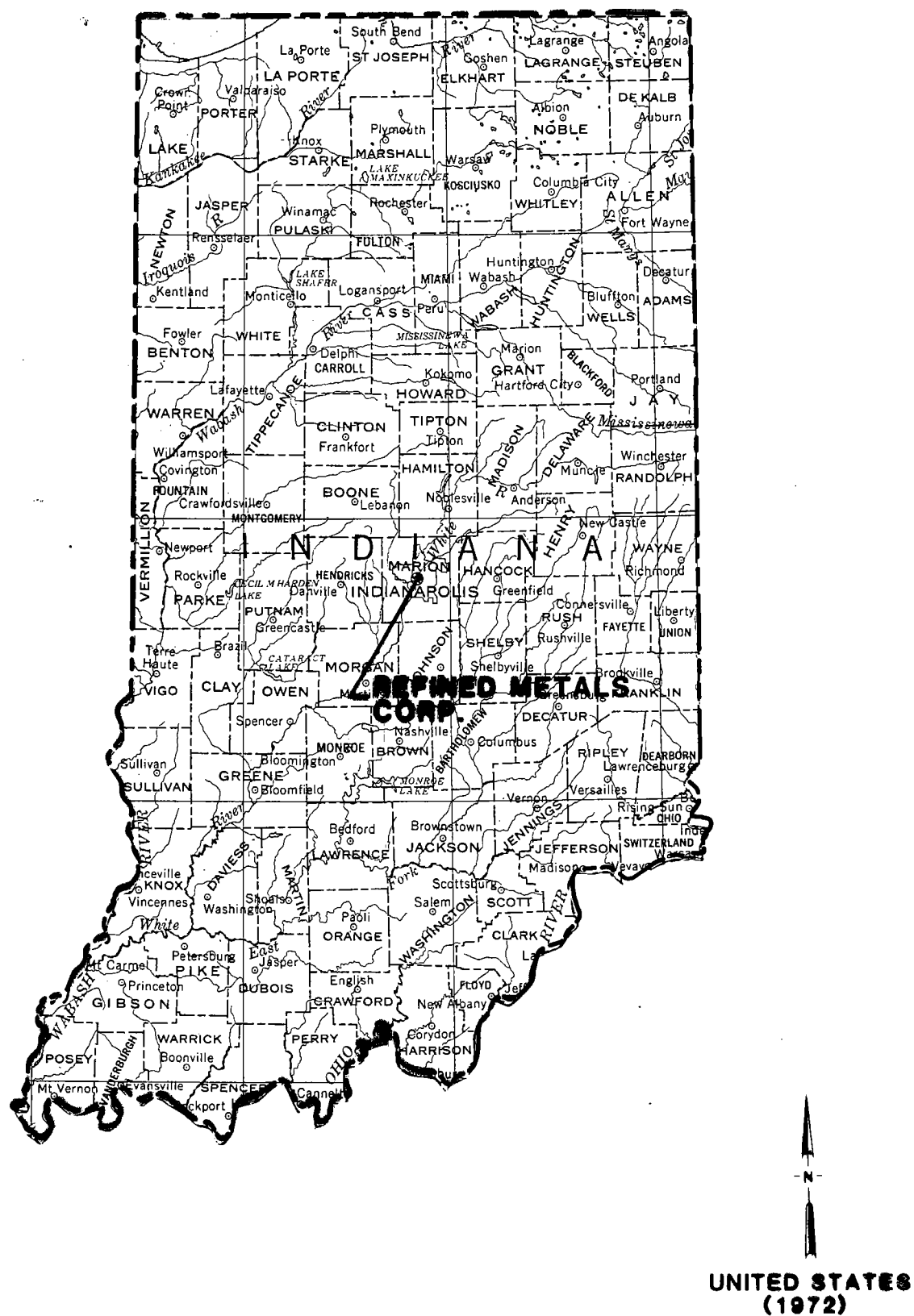


Figure 1. Site location map, Indiana. Scale 1:2,500,000.



## INTRODUCTION

This report presents a current analysis of the Refined Metals Corp. facility which is located in Indianapolis, Indiana. This report was prepared to document physical conditions and potential hazards at the site.

TABLE 1. REGION 5 SITES COVERED UNDER SERIES TS-AMD-87615†

Report serial number†	Site name	Location	Analysis type
1	Adams Center Landfill	Ft. Wayne, IN	Single-date
2	Arvin Automotive	North Vernon, IN	Single-date
3	Bohn Engine & Foundry	Greensburg, IN	Single-date
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7	GMC, Plant 5	Indianapolis, IN	Single-date
8	Indiana Steel & Wire	East Chicago, IN	Single-date
9	Inland Steel	East Chicago, IN	Single-date
10	Northside Sanitary Landfill	Zionsville, IN	Single-date
11	Quemetco	Indianapolis, IN	Single-date
#12	Refined Metals Corp.	Indianapolis, IN	Single-date
13	Stauffer Chemical	Hammond, IN	Single-date

†To identify individual reports, add the report serial number to the series number. For example TS-AMD-87615-2.

#Sites covered in this report.

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## METHODOLOGY

Stereoscopic pairs of current aerial photographs are used to perform the analysis. Stereo viewing enhances the interpretation because it allows the analyst to observe the vertical as well as horizontal spatial relationships of natural and cultural features. Stereoscopy is also an aid in distinguishing between various shapes, tones, textures, and colors that can be found within the study area.

Evidence of waste burial is a prime consideration when conducting a hazardous waste analysis. Leachate or seepage resulting from burial and dumping of hazardous materials might threaten existing surface or ground-water sources. Pools of unexplained liquid are routinely noted because they can indicate seepage from buried wastes that may enter drainage channels and allow contaminants to move off the site. An excellent indicator of how well hazardous materials are being handled at a site is the presence or absence of spills, spill stains, and vegetation damage. Trees and other forms of vegetation that exhibit a marked color difference from surrounding members of the same species are labeled "dead," "stressed," or "damaged" based upon the degree of noticeable variation. Vegetation is so labeled only after consideration of the season in which the photographs were acquired.

The U.S. Environmental Protection Agency's Statement of Procedures on Floodplain Management and Wetlands Protection (Executive Orders 11988 and 11990, respectively) requires EPA to determine if removal or remedial actions at hazardous waste sites will affect wetlands or floodplains and to avoid or minimize adverse impacts on those areas. To aid in compliance with these orders, significant wetland areas located within and adjacent to the sites have been identified and delineated. However, the sites have not been visited to verify the accuracy of wetland identification.

Drainage analysis determines the direction a spill or surface runoff would follow. Direction of drainage is determined from analysis of the photographs and from U.S. Geological Survey topographic maps. Whenever they are available, 7.5-minute quadrangle maps (scale 1:24,000) are used to show site location and to provide geographic and topographic information.



Results of the analysis are shown on annotated overlay attached to the photo.  
The following table provides documentation of the photograph used in this report.

TABLE 2. DOCUMENTATION OF AERIAL PHOTOGRAPHY

Study area, location, and geographic coordinates	Figure	Date of acquisition	Original scale	Film type†	Photo source‡
Refined Metals Corp. Indianapolis, Indiana (39°43.2'N 086°04.1'W)	3	September 4, 1987	1:6,000	CC	EMSL

†Film type identification:

CC Conventional color

‡Photo source identification:

EMSL: U.S. Environmental Protection Agency, Environmental Monitoring Systems  
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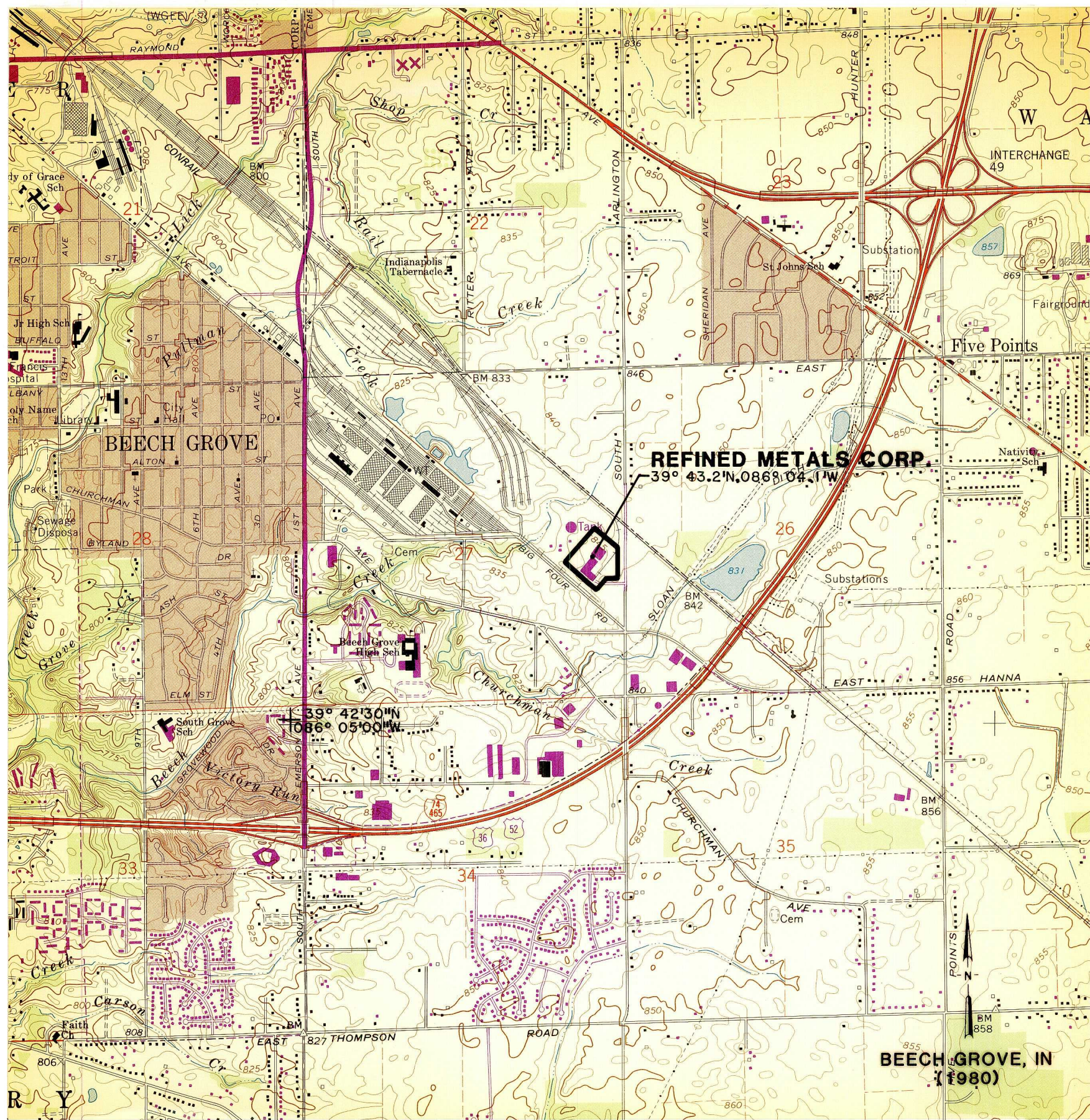


Figure 2. Local site location map, Beech Grove, Indiana. Scale 1:24,000.



#### ANALYSIS SUMMARY

The Refined Metals Corp. is a metal reclaiming facility which occupies approximately 11 acres in the eastern part of Indianapolis, Indiana. The site, fully operational, consists of processing buildings, a warehouse, office, and open storage areas. A large amount of scrap metal was noted throughout the facility. Groups of drums and mounded material were also observed. Spillage from the processing area appeared to be entering a drainage channel that exits the site and a lined holding pond appeared to be breached. This spillage and possible discharge from the pond may be a potential source of off-site contamination.

The site is located on a slight hill near two small creeks, but is not located near a major waterway and would not be affected by a 100-year flood event.

## PHOTO ANALYSIS

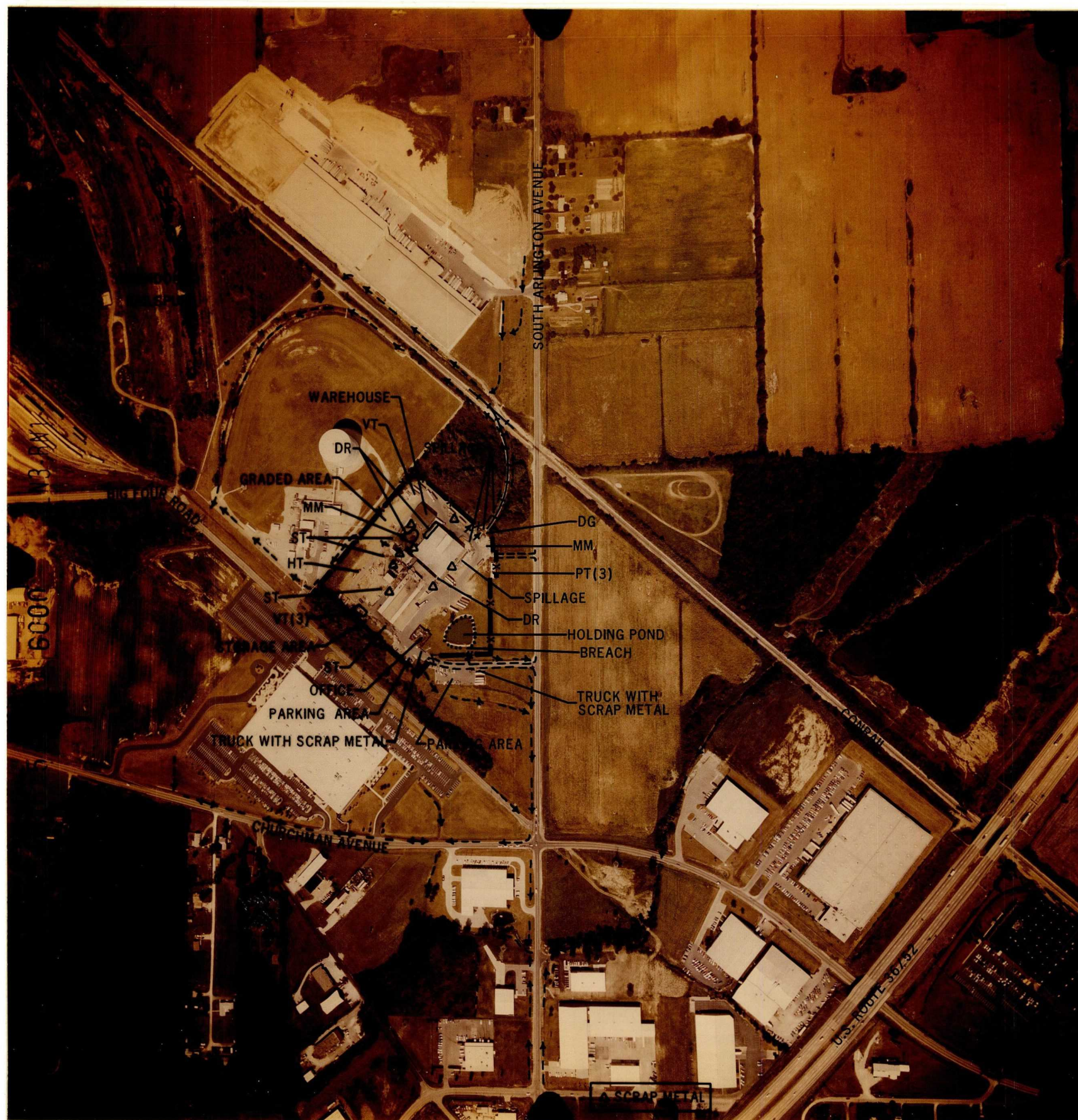
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Surface drainage from the northern portion of the facility would be to the north toward Beech Creek, and to the south toward Churchman Creek from the southern portion of the facility. Both Beech Creek and Churchman Creek flow to the west where they eventually empty into Lick Creek.

Access to the fenced facility is from the east via South Arlington Avenue.





## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- X-X-X-X FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- X X X X X FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- ← FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- ++++ RAILWAY

### SITE FEATURES

- ||||| DIKE
- SL STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
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Figure 3. Refined Metals Corp., September 4, 1987. Approximate scale 1:6,000.



TS-AMD-87615-12  
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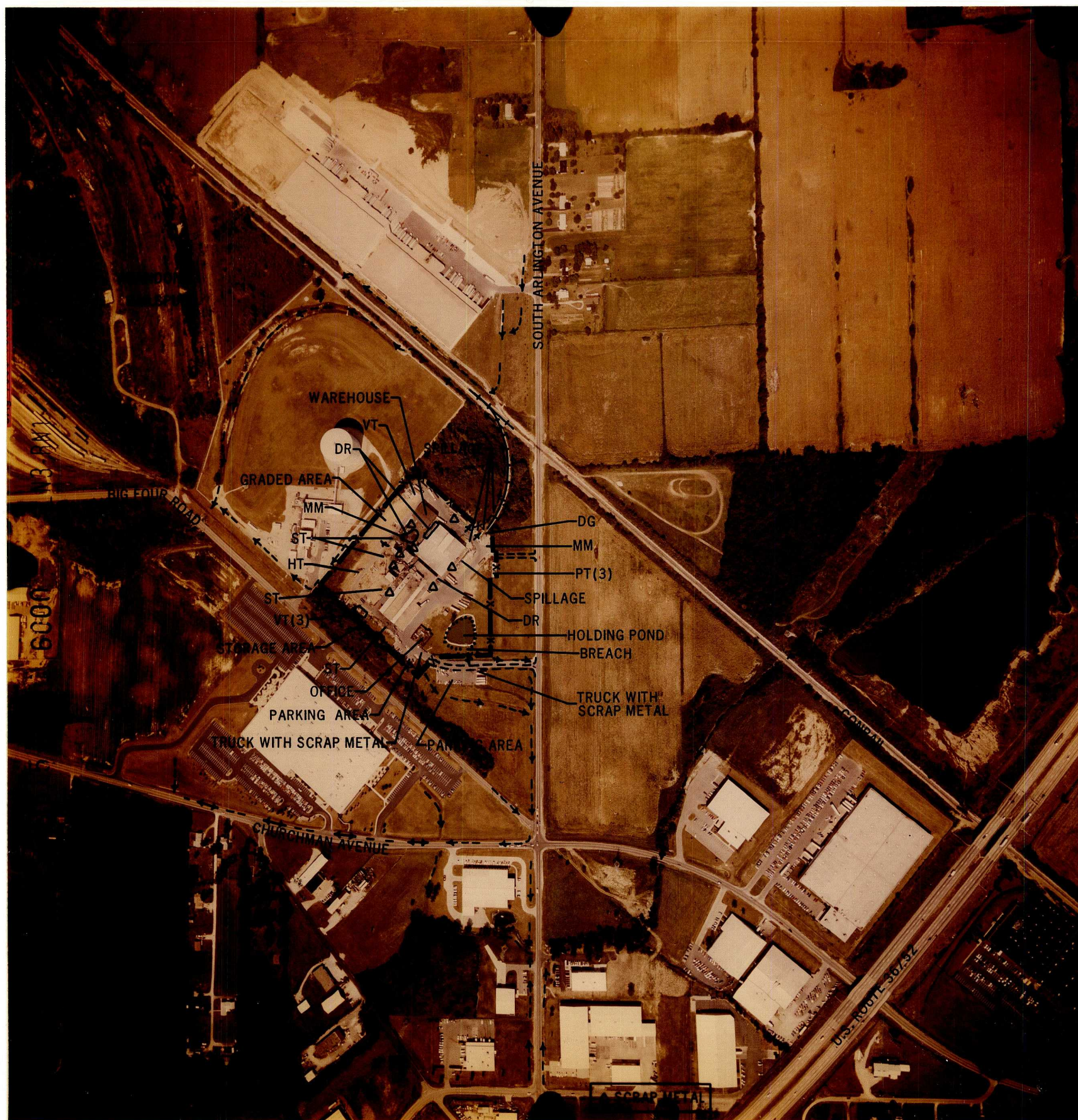
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